

Answer on Question #61863-Physics-Mechanics

7 The system shown is an example of the Atwood's machine. m_1 and m_2 are connected by a light inextensible string over a light and smooth pulley with $m_1 > m_2$. What is the acceleration of the masses?

Solution

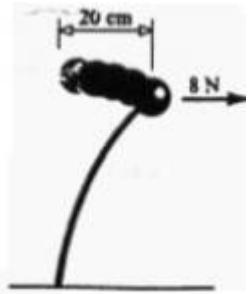
$$m_1 a = m_1 g - T$$

$$m_2 a = T - m_2 g$$

$$a = \frac{m_2 - m_1}{m_2 + m_1} g$$

12 A long light steel strip is clamp at the lower end and a 2.0-kg mass is fastened to the top end as shown in the figure. A horizontal force of 8.0 N is required to displace the mass to 20 cm one side. Assuming that the system undergoes simple harmonic motion when released, calculate the period of oscillation of the mass.

Solution



The force constant of the spring is

$$k = \frac{F}{x} = \frac{8}{0.2} = 40 \frac{N}{m}$$

The period of oscillation of the mass is

$$T = 2\pi \sqrt{\frac{m}{k}} = 2\pi \sqrt{\frac{2}{40}} = 1.4 \text{ s.}$$